

IN THE CLAIMS:

1. (Currently Amended) A non-volatile memory comprising:
an insulating substrate having a plurality of first electrodes extending therethrough from a front surface of the substrate to a rear surface thereof,
[[a]] one or more second electrode electrodes formed on one surface side of the substrate,
and
a recording layer held between the first electrodes and the second electrode and variable in resistance value by electric pulses applied across the first electrodes and the second electrode,
the plurality of first electrodes being electrically connected to the recording layer in a region constituting a single memory cell,
wherein the first electrodes are filled respectively in a plurality of fine pores formed in the insulating substrate, the fine pores being formed by irradiating the insulating substrate with a beam of ion or neutron high-energy particles perpendicular to the front surface thereof to produce defects in the insulating substrate, and selectively etching the defects produced.

2. (Cancelled)

3. (Currently Amended) The non-volatile memory according to claim 1 wherein the one or more second electrodes are provided in the form of stripes, and third electrodes are provided in the form of stripes on the other surface side of the insulating substrate and extend orthogonal to the second electrodes when seen from above, each of the third electrodes being electrically connected to at least some of the first electrodes, the second electrodes and the third electrodes forming laps when seen from above to provide memory cells in the respective regions of the laps.

4. (Original) The non-volatile memory according to claim 1 wherein the recording layer comprises a phase-change material having at least two stable phases different in resistance value and capable of being reversibly switched between the phases.

5. (Original) The non-volatile memory according to claim 4 wherein the phase-change material contains a chalcogenide material.

6. (Original) The non-volatile memory according to claim 1 wherein the first electrodes are randomly arranged relative to the insulating substrate.

7. (Currently Amended) The non-volatile memory according to claim 1 wherein the plurality of first electrodes are electrically connected to the recording layer in a plurality of regions constituting a plurality of memory cells, respectively, the memory cells are being different in the number of first electrodes contained therein.

8. (Original) The non-volatile memory according to claim 7 wherein each of the memory cells contains 0.5×10^1 to 4×10^3 first electrodes on the average.

9. (Original) The non-volatile memory according to claim 1 wherein each of the first electrodes has a diameter of 5 to 500 nm.

10. (Currently Amended) The non-volatile memory according to claim 1 wherein assuming that S1 is the total area of contact of the portions of the ~~intermediate~~ first electrodes contained in the

~~optional~~ memory cell with the recording layer and that S2 is the area of the recording layer contained in the ~~optional~~ memory cell, S1/S2 is in the range of 10^{-4} to 10^{-1} .

11. (Original) The non-volatile memory according to claim 1 wherein the recording layer comprises Ge-Sb-Te, and each of the first electrodes comprises at least one of rhodium (Rh), platinum (Pt), palladium (Pd), nickel (Ni), cobalt (Co), chromium (Cr), rhenium (Re), iridium (Ir) and gold (Au).

12. (Original) The non-volatile memory according to claim 1 wherein the insulating substrate is a polycarbonate substrate.

13. (Original) A paper display comprising the non-volatile memory according to claim 1.